Abstract

Microneedle devices for transport of molecules, including drugs and biological molecules, across tissue, are provided. The microneedle devices permit drug delivery or removal of body fluids at clinically relevant rates across skin or other tissue barriers, with minimal or no damage, pain, or irritation to the tissue. Microneedles can be formed of biodegradable or non-biodegradable polymeric materials or metals. In a preferred embodiment, a microneedle device includes a plugging element comprising a platform including a plurality of microneedle plugs for preventing skin or other tissue barriers from entering the hollow microneedles. In another preferred embodiment, a microneedle device includes a plurality of bioerodible elements for temporarily plugging the hollow microneedles, thereby preventing skin or other tissue barriers from entering the hollow microneedles.